

## CLAIMS

1. A manufacturing method for an infrared detection device including a thermal resistance element in which a thermal resistor substance contacts an electrode, the manufacturing  
5 method comprising:

an electrode formation step of forming the electrode in a predetermined shape on a substrate; and

a growth step of growing the thermal resistor substance on the electrode.

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2. A manufacturing method for an infrared detection device including a thermal resistance element in which a thermal resistor substance whose resistance changes according to temperature contacts an electrode, the manufacturing method  
15 comprising:

an electrode formation step of forming the electrode on a semiconductor substrate;

a thin film formation step of forming a thin film on the electrode;

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a thin film removal step of removing a portion of the thin film to expose the electrode; and

a growth step of growing the thermal resistor substance on the exposed electrode.

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3. The manufacturing method of claim 1 or 2, wherein the growth step selectively grows the thermal resistor substance on only the electrode by a vapor growth method.

4. The manufacturing method of claim 3, wherein  
the vapor growth method is a metal-organic chemical  
vapor deposition method.

5 5. The manufacturing method of claim 3, wherein the growth  
step includes:

a vaporization step of vaporizing a composition  
material of the thermal resistor substance into a gaseous  
material;

10 an ion clusterization step of ion clusterizing the  
gaseous material;

a collection step of collecting the ion clusterized  
gaseous material on the electrode by giving the electrode  
a predetermined electric potential to generate an electric  
15 field; and

a condensation step of causing the ion clusterized  
gaseous material to condense on the electrode by heating the  
electrode to a predetermined temperature, to grow the thermal  
resistor substance.

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6. The manufacturing method of claim 1 or 2, wherein  
the growth step selectively grows the thermal resistor  
substance by a liquid-phase growth method.

25 7. The manufacturing method of claim 6, wherein  
the liquid-phase growth method is an electrophoresis  
method.

8. The manufacturing method of claim 6, wherein the growth step includes:

a colloidization step of colloidizing a composition material of the thermal resistor substance into colloid particles;

a suspension generation step of generating a suspension including the colloid particles;

an electric field generation step of, with the semiconductor substrate being immersed in the suspension, applying a predetermined voltage to the electrode to generate an electric field; and

an aggregation step of causing the colloid particles to aggregate on the electrode by an action of the electric field, to grow the thermal resistor substance.

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9. The manufacturing method of claim 1 or 2, wherein

a crystal lattice constant of the electrode, along an interface with the thermal resistor substance, is substantially equal to a crystal lattice constant of the thermal resistor substance.

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10. The manufacturing method of claim 1 or 2, wherein

a material of the thermal resistor substance is a strongly correlated electron material expressed by a general formula  $\text{Pr}_x\text{Ca}_{1-x}\text{MnO}_3$ , to which a metal oxide, having a perovskite structure that includes an alkaline-earth metal or a rare-earth metal, has been added.

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11. The manufacturing method of claim 2, wherein  
the thin film is an insulation film.

12. The manufacturing method of claim 1 or 2, wherein  
5 the thermal resistor substance is a single crystal.

13. An infrared detection device including a thermal  
resistance element in which a thermal resistor substance  
whose resistance changes according to temperature contacts  
10 an electrode, the infrared detection device being  
manufactured by a manufacturing method including:

an electrode formation step of forming an electrode in  
a predetermined shape on a substrate; and

15 a growth step of growing a thermal resistor substance  
on the electrode.

14. An infrared detection device including a thermal  
resistance element in which a thermal resistor substance  
whose resistance changes according to temperature contacts  
20 an electrode, the infrared detection device being  
manufactured by a manufacturing method including:

an electrode formation step of forming the electrode  
on a semiconductor substrate;

25 a thin film formation step of forming a thin film on  
the electrode;

a thin film removal step of removing a portion of the  
thin film to expose the electrode; and

a growth step of growing the thermal resistor substance

on the exposed electrode.

15. The infrared detection device of claim 13 or 14, wherein  
the growth step selectively grows the thermal resistor  
5 substance on only the electrode by a vapor growth method.

16. The infrared detection device of claim 15, wherein  
the vapor growth method is a metal-organic chemical  
vapor deposition method.

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17. The infrared detection device of claim 15, wherein the  
growth step includes:

a vaporization step of vaporizing a composition  
material of the thermal resistor substance into a gaseous  
15 material;

an ion clusterization step of ion clusterizing the  
gaseous material;

a collection step of collecting the ion clusterized  
gaseous material on the electrode by giving the electrode  
20 a predetermined electric potential to generate an electric  
field; and

a condensation step of causing the ion clusterized  
gaseous material to condense on the electrode by heating the  
electrode to a predetermined temperature, to grow the thermal  
25 resistor substance.

18. The infrared detection device of claim 13 or 14, wherein  
the growth step selectively grows the thermal resistor

substance by a liquid-phase growth method.

19. The infrared detection device of claim 18, wherein  
the liquid-phase growth method is an electrophoresis  
5 method.

20. The infrared detection device of claim 18, wherein the  
growth step includes:

a colloidization step of colloidizing a composition  
10 material of the thermal resistor substance into colloid  
particles;

a suspension generation step of generating a suspension  
including the colloid particles;

an electric field generation step of, with the  
15 semiconductor substrate being immersed in the suspension,  
applying a predetermined voltage to the electrode to generate  
an electric field; and

an aggregation step of causing the colloid particles  
to aggregate on the electrode by an action of the electric  
20 field, to grow the thermal resistor substance.

21. The infrared detection device of claim 13 or 14, wherein  
a crystal lattice constant of the electrode, along an  
interface with the thermal resistor substance, is  
25 substantially equal to a crystal lattice constant of the  
thermal resistor substance.

22. The infrared detection device of claim 13 or 14, wherein

a material of the thermal resistor substance is a strongly correlated electron material expressed by a general formula  $\text{Pr}_x\text{Ca}_{1-x}\text{MnO}_3$ , to which a metal oxide, having a perovskite structure that includes an alkaline-earth metal or a rare-earth metal, has been added.

23. The infrared detection device of claim 14, wherein the thin film is an insulation film.

10 24. The infrared detection device of claim 13 or 14, wherein the thermal resistor substance is a single crystal.